REMARKS

The Title has been amended. Claims 1, 21, 29, 31, 38, 39 and 47 have been amended. Claims 8, 18, 19, 32, 46, 51, 60-63, 66 and 67 have been cancelled. Claims 58, 59, 64 and 65 have been withdrawn. Thus, claims 1 - 7, 9 - 17, 20 - 31, 33 - 45, 47 - 50 and 52 - 57 remain pending in the present application. In view of the above noted amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are in condition for allowance.

The Title has been objected to as not being clearly indicative of the invention to which the claims are directed. The Title has been amended to recite "Magnetic Principle Based Torque Sensor." It is therefore respectfully requested that the objection of the title be withdrawn.

Claims 1 - 7, 9 - 17, 20 - 23, 25 -29, 34 - 36, 38 - 45, 47 - 50 and 52 - 57 stand rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7, 9-17, 20-33, 35-38 and 40-45 of U.S. Patent No. 7,243,557 to May (hereinafter referred to as the '557 Patent). In view of the Terminal Disclaimer filed with the present Amendment, it is respectfully submitted that this rejection should be withdrawn.

Claims 1 - 6, 29, 30 and 38 - 44 stand provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 34 and 52 - 57 of U.S. Patent Application Serial No. 11/573,079 to May (hereinafter referred to as the '079 Appln). In view of the Terminal Disclaimer filed with the present Amendment, it is respectfully submitted that this rejection should be withdrawn.

Claim 48 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 48 depends from dependent claim 47, which has been

amended to depend from dependent claim 40. Dependent claim 40 recites a method comprising "applying a second current pulse to the sensor element." It is therefore submitted that there is a proper antecedent basis for the "second impulse" of claim 48 and that the objection should therefore be withdrawn.

Claims 1 - 22, 24 and 35 - 38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by PCT Publication Application No. WO 99/56099 to May et al. (hereinafter referred to as the '099 Patent).

Claim 1 recites "[a] torque sensor, comprising: a sensor element, wherein the sensor element is manufactured *by applying a first current pulse to the sensor element, the first current pulse being applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element; wherein the first current pulse is such that the application of the first current pulse generates a magnetically encoded region in the sensor element*; wherein *a second current pulse is applied to the sensor element in such a manner that there is a second current flow in a second direction along the longitudinal axis of the sensor element*, the second direction being opposite to the first direction; and wherein each of the first and second current pulses has a raising edge and a falling edge, the raising edge being steeper than the falling edge."

It is respectfully submitted that the '099 Patent does not teach or suggest the limitation of "a sensor element [that] is manufactured by applying a first current pulse to the sensor element, *the first current pulse being applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element; wherein the first current pulse is such that the application of the first current pulse generates a magnetically encoded region in the sensor element*; wherein *a second current pulse is applied to the sensor element in such a manner that there is a second current flow in a second direction along the longitudinal axis of the sensor element*" as recited in claim 1.

In support of the rejection, the Examiner has indicated that the recited claim is not

limited to the manipulation of the recited steps but rather only to the structure implied by these steps. (*See* 10/7/08 Office Action, p. 7). However, it is respectfully submitted that the recited elements of claim 1 have a specific implication on the claimed structure. It is well known in the art that a magnetic field generated by a moving electrical charge such as a "first current pulse," as recited in claim 1 has magnetic field lines that follow a different pattern than a magnetic field generated by, for example, a steady current or permanent magnet, as taught by the '099 Patent. Specifically, in one embodiment, the '099 Patent is directed to generating a magnetic field via a series of permanent magnets 38, wherein magnetic field lines are shown to point away from a north end of the permanent magnet and toward a south end thereof. (*See* '099 Patent, p. 16, ll. 9 - 36; Figs. 4a - 4f). In another embodiment, the '099 Patent is directed to generating a magnetic field via a direct current 60, wherein magnetic field lines form concentric circles around the direction of the direct current 60. (*See* '099 Patent, p. 17, li. 16 – p. 18, li. 18; Figs. 5a - 5b). It is therefore respectfully submitted that a "magnetically encoded region" generated by the recitation of claim 1 is structurally distinct from that generated by any disclosure in the '099 Patent. Furthermore, it is submitted that the '099 Patent does not teach or suggest the use of any current pulses to generate a magnetically encoded region. It is therefore respectfully submitted that the limitation of "a sensor element [] manufactured by applying a first current pulse to the sensor element, the first current pulse being applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element, *wherein the first current pulse is such that application of the first current pulse generates a magnetically encoded region in the sensor element*" as recited in claim 1 has implication on the recited structure of claim 1.

It is therefore respectfully submitted that the '099 Patent fails to teach or suggest a "sensor element [] manufactured by applying a first current pulse to the sensor element, *the first current pulse being applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element*; *wherein the first current pulse is such that the application of the first current pulse generates a magnetically encoded region in the sensor element*; wherein *a second current pulse is applied to the sensor element in such a manner that there is a second current flow in a second direction along the longitudinal axis*

of the sensor element" as recited in claim 1 and that claim 1 is allowable for at least this reason. Because claims 5 - 7, 9 - 17, 20 - 22 and 24 depend from and therefore include all of the limitations of claim 1, it is respectfully submitted that these claims are also allowable.

Amended claim 29 recites limitations substantially similar to claim 1, including "[a] torque sensor, comprising: a first sensor element with a magnetically encoded region, the first sensor element having a surface, wherein, in a direction essentially perpendicular to the surface of the first sensor element, the magnetically encoded region of the first sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction, the first direction being opposite to the second direction, *wherein the first sensor element has variations in a material of the first sensor element caused by one of at least one current pulse and surge applied to the first sensor element for altering the magnetically encoded region.*" It is therefore respectfully submitted that claim 29 is allowable over the '099 Patent for the same reasons noted above with respect to claim 1. Because claims 31, 34, 35, 37 and 38 depend from and therefore include all of the limitations of claim 29, it is respectfully submitted that these claims are also allowable.

Claims 40 and 47 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the '099 Patent.

Claim 40 depends from and therefore includes all of the limitations of claim 39. Claim 39 recites limitations substantially similar to claim 1, including "[a] method for magnetically encoding a sensor element for a torque sensor, comprising: *applying a first current pulse to sensor in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element, wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element.*" It is therefore respectfully submitted that claim 39 is allowable over the '099 Patent for the same reasons noted above with respect to claim 1. Because claim 47 depends from and therefore includes all of the limitations of claim 39, it is respectfully submitted that this claim is also allowable.

CONCLUSION

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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